

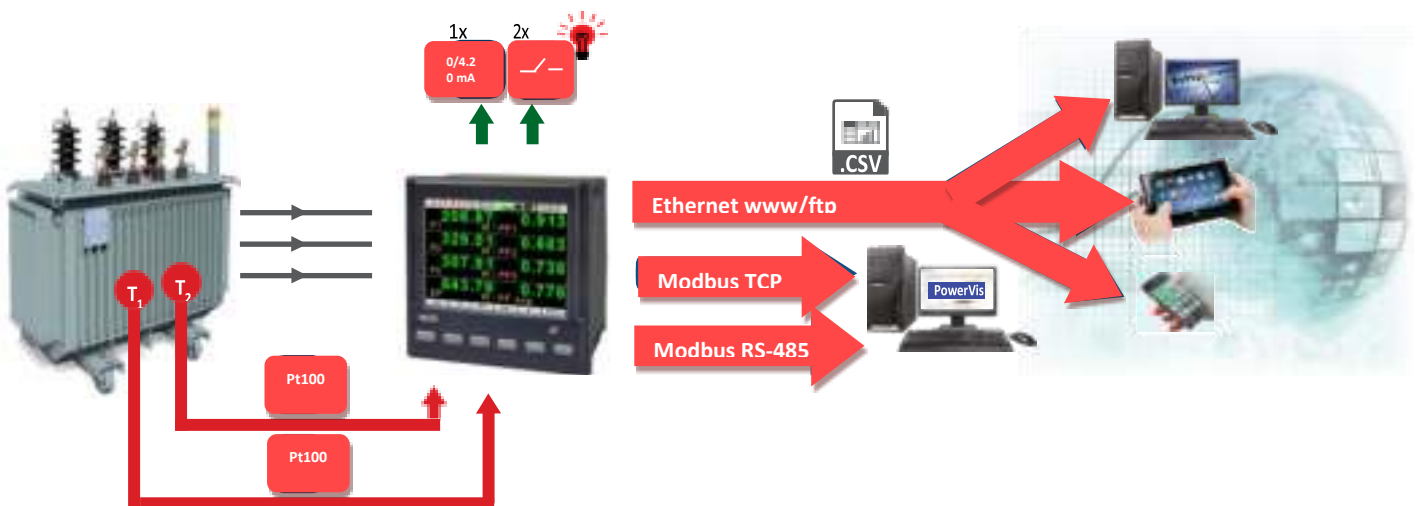
# ND30

## -METER OF POWER NETWORK PARAMETERS



- **Measurement and recording** of 54 power network parameters, including **current and voltage harmonics up to 51st**, in 1-phase 2-wire or 3-phase 3 or 4-wire balanced and unbalanced systems.
- **graphical color display**: ICD TFT 3,5", 320 x 240 pixels, **fully configurable by a user** (10 views, 8 parameters in each)
- indications include the values of programmed ratios.
- Memory of minimum and maximum values.
- 2 configurable alarm outputs.
- Optional: analog output 0/4...20 mA and 2 PT 100 inputs (eg. for measurement of transformer temperature).
- Data archiving in the internal memory 8GB (option).
- Digital output RS-485 - MODBUS protocol.
- **Modern and user-friendly Ethernet interface** 10/100 BASE-T (option):
  - protocol: MODBUS TCP/IP, HTTP, FTP,
  - services: www server, ftp server, DHCP client.
- Programming of parameters using **free econ software**.
- Battery backup RTC.
- Overall dimensions: 96x96x77 mm.






















### EXAMPLE OF APPLICATION



### MEASUREMENT AND VISUALIZATION OF POWER NETWORK PARAMETERS

- phase voltages:  $U_1, U_2, U_3$
- phase-to-phase voltages:  $U_{12}, U_{23}, U_{31}$
- phase currents  $i_1, i_2, i_3$
- active phase powers:  $P_1, P_2, P_3$
- reactive phase powers:  $Q_1, Q_2, Q_3$
- apparent phase powers:  $S_1, S_2, S_3$
- active power factors:  $PF_1, PF_2, PF_3$
- reactive/active power factors:  $tg\alpha_1, tg\alpha_2, tg\alpha_3$
- active, reactive and apparent 3-phase power:  $P, Q, S$
- mean 3-phase power factors:  $PF, tg\alpha$
- frequency  $f$
- mean 3-phase voltage:  $U_s$
- mean phase-to-phase voltage:  $U_{mf}$
- mean 3-phase current:  $i_s$
- 15, 30, 60 minutes' mean active power:  $P_{demand}$
- mean apparent power  $S_{demand}$
- average current  $i_{demand}$
- active, reactive and apparent 3-phase energy:  $EnP, EnQ, EnS$
- active, reactive and apparent energy from external counter:  $EnPE$
- total harmonic content coefficients for phase voltages and currents  $THD_{U1}, THD_{U2}, THD_{U3}, THD_{I1}, THD_{I2}, THD_{I3}$  and for 3-phase voltages and currents  $THD_U, THD_I$
- harmonics for current and phase voltage up to 51 st!
- temperature (2 x Pt100 input)

# ND30 - METER OF POWER NETWORK PARAMETERS

FEATURES	INPUTS	OUTPUTS	GALVANIC ISOLATION
     	 	   	        

## TECHNICAL DATA

### MEASURING RANGE

Measured value	Measuring range	I1	I2	I3	Σ	class (*) / Basic error (*) class relative to the measured value acc. to en61557-12
Current I/5A 1 A~ 5 A~	0.010 ..0.100..1.200 A (tr_i=1) 0.050 ..0.500..6.000 A (tr_i=1) ...20.00 kA (tr_i≠1)	•	•	•		Class 0.2
Voltage I-N 57.7 V~ 230 V~ 400 V~	5.7..11.5 ..70.0 V (tr_U=1) 23.0..46 ..276.0 V (tr_U=1) 40.0..80 ..480.0 V (tr_U=1) ...480.0 kV (tr_U≠1)	•	•	•		Class 0.2
Voltage I-I 100 V~ 400 V~ 690 V~	10.0 ..20..120.0 V (tr_U=1) 40.0..80 ..480.0 V (tr_U=1) 69.0..138 ..830.0 V (tr_U=1) ...830.0 kV (tr_U≠1)	•	•	•		Class 0.5
Active power P <sub>i</sub> , average active power P <sub>dt</sub>	.. (-)1999.9 W ..(-)1999.9 MW (tr_U≠1.tr_i≠1)	•	•	•	•	Class 0.5
Reactive power Q <sub>i</sub>	.. (-)1999.9 Var ..(-)1999.9 MVar (tr_U≠1.tr_i≠1)	•	•	•	•	Class 1
Apparent power S <sub>i</sub> , average apparent power S <sub>dt</sub>	..1999.9 VA ..1999.9 MVA (tr_U≠1.tr_i≠1)	•	•	•	•	Class 0.5
Active energy EnP (imported or exported)	.. (-)1999.9 Wh ..(-)1999.9 MWh (tr_U≠1.tr_i≠1)				•	Class 0.5
Reactive energy EnQ (inductive or capacitive)	.. (-)1999.9 Varh ..(-)1999.9 MVarh (tr_U≠1.tr_i≠1)				•	Class 1
Apparent energy EnS	.. 1999.9 VAh ..1999.9 MVAh (tr_U≠1.tr_i≠1)				•	Class 0.5
Active power factor PF <sub>i</sub>	-1.00 ..0 ..1.00	•	•	•	•	± 0.01 of basic error
Coefficient tgφ <sub>i</sub> (ratio of reactive power to active power)	-1.20 ..0 ..1.20	•	•	•	•	± 0.01 of basic error
Frequency f	45.00..65.00 Hz				•	Class 0.1
Total harmonic distortion of voltage THDU and current THDi	0.0 ..100.0 %	•	•	•	•	Class 5 50 / 60 Hz
Amplitudes of the voltage U <sub>i1</sub> ... U <sub>i50</sub> , and current i <sub>i1</sub> ... i <sub>i50</sub>	0.0 ..100.0 %	•	•	•		Class 5 50 / 60 Hz

tr\_i, tr\_U – ratio of current and voltage transformer

### INPUTS

input type	properties
input Pt100 (T1, T2) - option	2 x Pt100, 2-wire, -50...400°C, basic error 0.5 %

### DIGITAL INTERFACE

interface type	transmission protocol	remarks
RS-485	Modbus RTU 8N2,8E1,8O1,8N1 Address 1..247	baud rate: 4.8, 9.6, 19.2 38.4, 57.6, 115.2 kbit/s
Ethernet 10/100 Base-T -option	Modbus TCP,HTTP,FTP	WWW server, FTP server, DHCP client

# ND30 - METER OF POWER NETWORK PARAMETERS

## EXTERNAL FEATURES

readout field	graphic color display ICD TFT 3,5", 320 x 240 pixels	
overall dimensions	96 x 96 x 77 mm	mounting hole 92.5 x 92.5 mm
Weight	0.3 kg	
protection grade	from frontal side: iP65	from terminal side: iP20

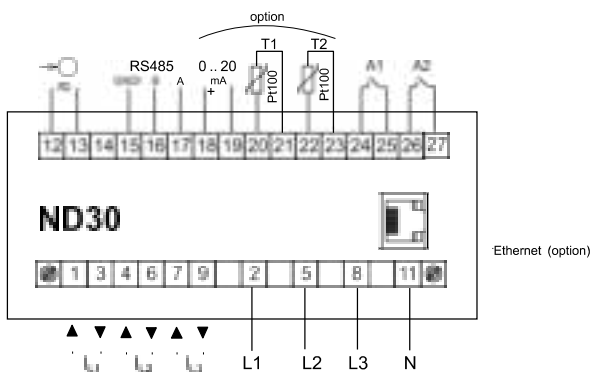
## RATED OPERATING CONDITIONS

supply voltage	85...253V a.c. (40...50...400Hz), 90...300V d.c. or 20...40V a.c., 20...60V d.c.	power consumption $\leq$ 6 VA
power consumption	in voltage circuit $\leq$ 0.2 VA	in current circuit $\leq$ 0.1 VA
input signal	0...0.1...1.2 in; 0.1...0.2...1.2 Un for current, voltage, PF, tg $\phi$	frequency 45...50...60...65 Hz, sinusoidal (THD $\leq$ 8%)
power factor	-1...0...1	
preheating time	5 min.	
ambient temperature	-10...23...55°C, class k55 acc. to EN61557-12	
Humidity	0...40...65...95%	
operating position	any	
external magnetic field	$\leq$ 40...400 A/m d.c.	$\leq$ 3 A/m a.c. 50/60 Hz
short-term overload	voltage input: 2 Un (5 sec.)	current input 50 A (1 sec.)
admissible crest factor	current: 2	voltage: 2
additional error (in % of the intrinsic error)		from ambient temperature change: $<$ 50% / 10°C

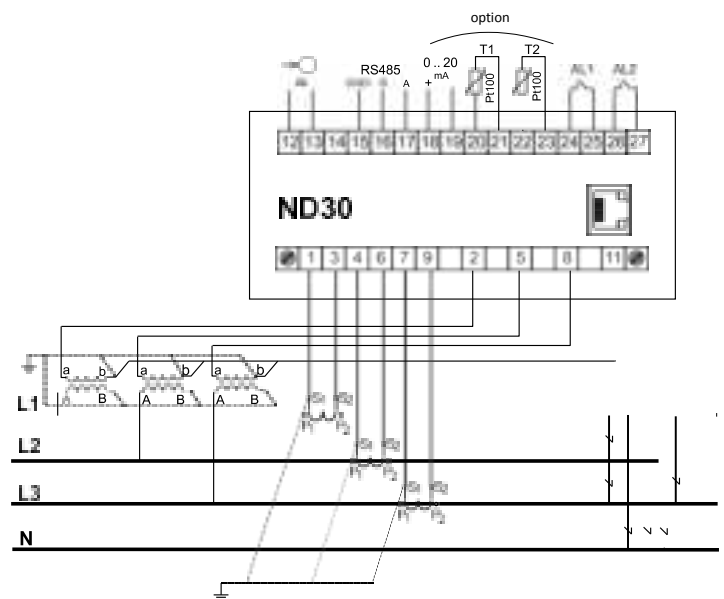
## SAFETY AND COMPATIBILITY REQUIREMENTS

electromagnetic compatibility	noise immunity	acc. to EN 61000-6-2
	noise emissions	acc. to EN 61000-6-4
isolation insured by the casing	double	acc. to EN 61010-1
isolation between circuits	basic	acc. to EN 61010-1
pollution level	2	acc. to EN 61010-1
installation category	iii	acc. to EN 61010-1
Maximal phase-to-earth voltage	<ul style="list-style-type: none"> <li>for supply circuit and relay outputs 300 V</li> <li>for measuring input 500 V</li> <li>for circuits of RS-485, Ethernet, pulse input and output, analog outputs: 50 V</li> </ul>	acc. to EN 61010-1
altitude a.s.l.	$<$ 2000 m	

## CONNECTION DIAGRAMS



Description of meter connections strips



indirect measurement in 4-wire network - connection of input signals

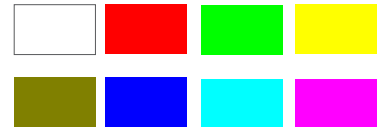
## DISPLACING OF MEASUREMENT PARAMETERS



up to 10 programmable screens  
(8 parameters per page);  
ability to change color for all screens



Available colors for digital indications:



two screens dedicated to harmonics;  
indication of individual harmonic  
for voltages and currents (up to 51st);  
bargraph presentation for all harmonics  
with zoom function

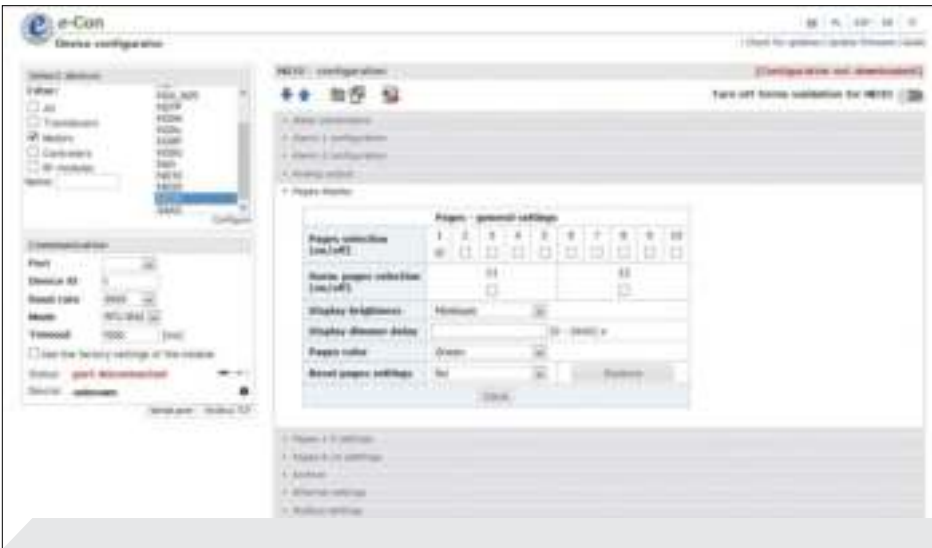


easy to use and intuitive menu;  
information bar with status of: phase  
sequence, alarm outputs, temperature  
measurements\*, archiving and memory\*,  
Ethernet\* and RS-485 interfaces,  
time and date

\*- availability of feature depends on  
hardware version of ND30

# ND30 - METER OF POWER NETWORK PARAMETERS

## METER CONFIGURATION WITH FREE eCON SOFTWARE



ability to configure and update ND30 with free eCon software (via RS-485 or Ethernet\* interface)

\*- availability of feature depends on hardware version of ND30

## REMOTE READOUT OF PARAMETERS THROUGH ETHERNET: WWW SERVER, FTP



WEB server\* for remote reading of current measurement data; FTP server\* for downloading archived CSV files

\*- availability of feature depends on hardware version of ND30



# ND30 - METER OF POWER NETWORK PARAMETERS

## ORDERING CODE

Meter ND30 -	X	X	X	X	XX	X	X
<b>input voltage (phase/phase-to-phase) un:</b>							
3 x 57.7/ 100 V, 3x 230/ 400 V	1						
3 x 110/ 190 V, 3 x 400/ 690 V	2						
<b>additional outputs /inputs:</b>							
2 relays	1						
2 relays, 1 analog output, 2 inputs PT100	2						
<b>interface:</b>							
RS-485		1					
RS-485 and Ethernet, internal memory		2					
<b>supply:</b>							
85...253 V a.c., 90...300 V d.c.			1				
20...40 V a.c., 20...60 V d.c.			2				
<b>version:</b>							
standard				00			
custom-made*				XX			
<b>language:</b>							
Polish						P	
English						E	
other*						X	
<b>acceptance tests:</b>							
without additional quality requirements							0
with an extra quality inspection certificate							1
acc.to customer's request*							X

### order example:

The code: **nD30 - 1 2 2 1 00 e 0** means:

**nD30** - meter ND30

**1** - input voltage 3 x 57.7/ 100 V, 3x 230/ 400 V

**2** - 2 relays, 1 analog output, 2 inputs PT100

**2** - RS-485 and Ethernet, internal memory

**1** - supply: 85...253 V a.c., 90...300 V d.c.

**00** - standard version

**e** - user's manual in English

**0** - without additional quality requirements.

\* only after agreeing with the manufacturer

## SEE ALSO:



**ND40** - power network analyzer/



**RE92** - dual loop



**P30U** - universal transducer of temperature and standard signals



**KS31** - Digital synchronizing unit



**N43** - rail mounted 3-phase power network



**P43** - 3-phase transducer of power network parameters



**ND1** - analyser of network parameters



Current transformers from 5 A up to 6 kA



Free **eCON** software

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